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# 6-INCH B.L. HOWITZER.

## SECTION GUN DRILL

1912.

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## SECTION GUN DRILL.

(In all words of command the word "gun" will be used instead of "howitzer" for the sake of brevity.)

### THE DETACHMENT.

The detachment consists of 10 members, who will fall in two deep, 1 on the left of the front rank.

#### To Tell Off.

Section Commander.	No. 1.
".....Section—Tell off."	.....

On the order "*Tell off*" from the Section Commander—1 numbers 1, the right-hand man of the rear rank 2, his front rank man 3, and so on in succession to the left.

#### Detachment Rear.

Formed as above—when unlimbered, to the rear of the trail or platform, facing the front; when limbered up, one yard in rear of the muzzle—1 covering the left (or near) wheel.

#### To Move the Gun with Drag Ropes.

Section Commander.	No. 1.
".....Section—With drag ropes, Prepare to Advance."	.....

At this order from the Section Commander, 6 and 7 hand the drag ropes to 2 and 3; 2 and 3 hook them to the drag washers on their own sides; odd numbers on the off side, even numbers on the near side. All available numbers man them on their own sides, the two highest numbers to the shafts.

### To Shift the Gun from the Travelling to the Firing Position.

Section Commander.	No. 1.
"Shift from Travelling to Firing Position."	"No.....Prepare to shift the Gun."
	"Prepare to bear down."
	"Bear down." "Heave."

On the order "*Prepare to shift the gun*," 2 and 3 thread the rope round the breech, if not already in position, and lead the ends to the rear; 8 puts on the brake.

At "*Prepare to bear down*," 4 places a handspike in the bore point first; 6, one under it as a wedge; 7, one across to 8; 9, one across to 10; 5 goes to the elevating wheel; 2 and 3 man the ropes; 1 mounts on the trail and stands ready with a handspike.

On the order "*Bear down*," the Nos. on the handspikes bear down; 5 depresses, 1 pushes his handspike under the breech to prevent the gun from coming to the rear. As soon as the gun is borne down sufficiently to clear the housing bracket, 2 and 3 heave on the ropes and assist the gun to the rear; 1 and 5 replace the nuts on the ends of the piston rods; 2 and 3 remove their rope.

In replacing the nuts on the ends of the piston rods, when the gun is in the firing position, the following points must be attended to:—

- (1) The nuts on the piston rods in front of the lugs on the gun must be screwed up to the front end of the thread.
- (2) Screw on the rear nuts until the threads begin to show beyond the nuts. Care must be taken that the taper-hole through the nut coincides with the taper-hole through the piston rod before the keep pin is inserted. The direction of the taper is marked on the face of these parts.

The drill as laid down is for one detachment. It is possible for one detachment to do this shift, but it entails very heavy work, so whenever possible, extra men should be put on. If two detachments are available, the second detachment should be used as follows:—7, 8, 9, and 10 double-man the handspikes, the remaining numbers double-man the ropes.

### To Unlimber.

Section Commander.	No. 1.
".....Section Unlimber."	"No.....Prepare to Unlimber."
	"Lift." "Limber drive on."
	"Lower."

At the order from 1, "*Prepare to Unlimber*," 2, 3, 4, 5, 6, and 7 stand to the trail, 2 and 3 nearest the breech; 8, 9, and 10 go to

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the shafts, 7 unkeys. 1 then gives "*Lift*," "*Limber drive on*." The limber moves clear, 6 and 7 pushing in rear, 2 and 3 lower the anchoring buffer, if attached. The detachment then take post. The limbers should be placed on the flanks of the battery in action as much under cover as possible, but should there be no cover at a convenient distance from the battery, the limbers of the right section of four guns (right-hand gun of two guns) should be placed about 20 yards to the right rear of the battery: those of the left section of four guns (left gun of two guns) should be placed about 20 yards to the left rear of the battery, shafts to the front.

### To Limber Up.

Is the reverse of the above.

### Positions in Action.

1. One yard in rear of the trail, facing the front.
2. Close to and facing the breech on the right side.
3. Close to and facing the breech on the left side.
4. In line with the trail eye covering the right gun wheel.
5. In line with the trail eye covering the left gun wheel.
6. With the metal-lined cartridge case,
- 7 and 9. With the shells.
8. At the cartridge magazine.
10. At the expense shell store or ammunition wagon.

### To Prepare for Action.\*

Section Commander.	No. 1.
"...Section—Prepare for Action."	"Prepare for Action."

"Prepare for Action."—The numbers provide themselves with stores as follows:—

1. 6-foot handspike clinometer, piece of chalk, spanner, hydraulic buffer No. 82, and spanner No. 265.
2. 6-foot handspike, a maul, rammer, wrench breech mechanism, vent bit, rimer, tube pocket and lanyard (for drill, a drill tube), check ropes (if required).
3. 6-foot handspike, two aiming posts, a 5-foot picket, oil can, Russian tallow, waste; removes the breech and muzzle

\* Before leaving the gun park, No. 1 will test the clinometer for index error and will himself see that the buffers are filled with oil and the cut-off valves screwed home, and that the gun and mounting are ready in every respect for practice, the cut-off valves are always to be tested with the spanner provided. He will be careful to note if the glands of the hydraulic buffer are leaking; if the glands leak a serious accident may occur to the equipment during firing owing to the loss of liquid from the hydraulic buffer.

covers, shifting rope, if not already on the gun, and assists No. 2 with check ropes.

4. 6-foot handspike, sights and metal arc, or dial sight.
5. 6-foot handspike, handle of pump, McMahon spanner, and lever jamming handwheel (for drill, a shell extractor).
6. Two drill cartridges.
7. Two fuze keys (for drill, a drill shell).
8. Metal-lined case with key. In battery only one per section is brought up by the Nos. 8 of Nos. 1 and 3 guns.\*
9. Loading tray and brush.
10. Hammer and file for removing burrs, 2 heavy drag ropes.

The handspikes are laid down, two on each side of the howitzer, close to the carriage, points to the front, bevelled side uppermost; those of 2 and 3 outside, and about 2 feet in advance of those of 4 and 5; 1's handspike in rear of the platform.

2 and 3 lay down their stores, aiming posts on the ground, clear of the platform, on the right of the gun and parallel to it, the picket and maul outside the aiming posts, heads to the front, the maul outside, the rammer head to the front, inside the aiming posts.

2 straps the tube pocket round his waist, coils up the lanyard, passes the bight under the tube pocket strap, and receives the tubes from 7.

3 places the oil can, Russian tallow, and waste in a convenient position for use.

4 places the sights in the gun, and clamps them at zero of the deflection scale, and the sliding leaves at the centre graduation; or, if dial sights are used, clamps all readings at zero and focusses the telescope, seeing that it is mounted so that the object glass is pointing to the rear.

5 places the handle of the pump in the bracket on the carriage, places the lever jamming handwheel on the left of the gun after having tightened up the jamming handwheel as far as possible, and the McMahon spanner in the left bracket of the trail.

6 places the drill cartridges in the metal-lined case brought up by 8.

7 obtains tubes and fuzes from 10, and gives the tubes to 2; he fuzes shell as ordered. At drill he places the drill shell in the loading tray.

8 places his metal-lined case in a position, under cover if possible, convenient for the two guns (otherwise about 10 yards in rear of them).

9 examines the shells and cleans them if necessary.

10 prepares to issue shells, tubes, and fuzes.

The stores having been arranged, 1 receives reports from the numbers responsible of any irregularity or deficiency in connection

\* The Nos. 8 of Nos. 2 and 4 gun issue cartridges from the magazine, assist to load them on trollies, and take back the trollies.

with the gun, ammunition, or stores. He will see that the bore is clear.

5 will bring the gun into a horizontal position. 2 and 3 open the breech; 2 examines the breech screw and vent and sees that they are clean, and rimes out the vent, and sees that the threads of the breech screw are free from burrs, rubbing the asbestos pad with Russian tallow; 3 examines the bore, chamber, and threads of the breech, lubricating the threads with a slight film of oil, if necessary.

#### To Open the Breech.

2 and 3 will open the breech as follows:—3 releases the spring catch of cam lever with his right hand, and raises the lever to its full extent, then with both hands gives it a sharp pull towards him till hard against the stop, folds the lever down sufficiently far to release the breech screw, and then raises it again; 2 then takes hold of the handle of the breech screw with his right hand and of the cam lever with his left, withdraws the breech screw, and swings it sharply round in its carrier ring with the cam lever up.

#### To Close the Breech.

2 takes hold of the cam lever with his right hand, releases the latch retaining carrier ring open with his left hand, and swings the breech screw round; 3 takes the cam lever from 2; 2 shifts both hands on to the handle of the breech screw\* and pushes it home; 3, assisted by 2 if necessary, locks it, forcing the cam lever from him (if loaded, 2 inserts a tube); 3 lowers the cam lever, securing it by the catch in the handle of the breech screw.

#### To Load.

Section Commander.

No. 1.

".....load."

1 gives out the nature of shell, fuze, and charge required. He places himself in a convenient position where he can superintend the loading.

10 issues a shell to 7 and 9.

8 issues a cartridge to 6.

7 and 9 bring up a shell in bearer, having fixed and set the fuze according to 1's direction. Clamping time fuzes as tight as possible.† 7 and 9 place the shell in the bore after 3 has uncapped the fuze or removed the safety pins.

\* 2 must be careful to keep his hands clear of the stop on the carrier ring as the breech screw is turned round.

† Time fuzes should be securely clamped to reduce the chances of prematures, caused by the slipping of the time ring.

2 supplies himself with the rammer and holds it in a horizontal position, right hand back up near the rammer head, left hand back down near the centre; he inserts the rammer head in the bore, and reaches out to the end of the rammer.

3 pushes the shell by hand into the bore and takes hold of the rammer in a similar manner to 2. On the word "Home" from 1, 2 and 3 ram home in one motion, putting all their weight on the rammer; 2 withdraws the rammer and replaces it.

9 removes the empty bearer.

6 brings up a cartridge and hands it to 3.

3 takes the cartridge with his right hand and places it in the bore with the base of the core to the rear.

2 and 3 close the breech.

2 puts the tube in the vent\* after the breech is closed.

1 will satisfy himself that the breech is properly closed, and report—"loaded and ready for action"—to the section commander.

The line of fire is now laid out :—

### To Lay Out the Line of Fire.

The line of fire will be obtained by one of the methods described in Garrison Artillery Training, Vol. II (Siege). When an aiming post has to be held up at the sight, this will be done by 4, while 6 will take out aiming posts to the front or rear when required.

### To Lay the Gun in the Line of Fire.

Section Commander.

"Layers."

No. 1.

"Take post to lay."

The arc, or dial sight, being on the gun, 4 holds up an aiming post as directed in G.A.T. Vol. II (Siege); 2 and 3 pick up their handspikes and go to the end of the trail, facing the front, ready to traverse; 5 goes to the elevating wheel.

As soon as the line of fire angle has been received, 1 repeats it, and 4 lays down the aiming post.

If arcs are being used, 4 sets the reader to the angle ordered; if dial sights, 1 puts the angle on the sight by clamping the base plate at the number of degrees and then putting the minutes on the small slow-motion drum.

4 then lays on the director, and gives "Take post" when 2 and 3 lay down their handspikes and take post.

An auxiliary mark is then picked up. If arcs are being used the procedure is as described in G.A.T. Vol. II (Siege); 2 attending

\* The tube is never to be inserted before the breech is closed under any pretext whatever.

to the sliding leaf of the tangent sight and 4 to that of the foresight or the reader of the arc.

If the dial sights are being used, 1 unclamps the base plate of the sight, and sets the small slow-motion drum to zero; 4 lays the telescope on the selected auxiliary mark; 1 clamps the base plate at the nearest degree below the actual reading; and 4 gets the pointer of the telescope accurately on the auxiliary mark by turning the small slow-motion drum; 4 then gives "Take post."

1 notes all readings, marks them on the gun or marking board, and takes post.

If the gun is not on a platform, check ropes will if necessary be adjusted to the trail and wheels as soon as the auxiliary mark is picked up. 3 and 5 will make fast to the felloe of the left wheel, 1 will superintend and attend to the trail, 2 and 4 will make fast to the felloe of the right wheel. In making fast check ropes care should be taken that they are evenly attached to both wheels, as otherwise the gun will recoil out of line. It may be necessary to raise one axletree arm with a jack to ensure this.

If the gun is on a platform the trail plank and wheel plates should be adjusted as soon as the gun is roughly layed on the director.

To adjust the trail plank, 2 and 3 place their handspikes under the trail eye and raise it; 1 and 5 shift the plank. To adjust wheel plates, 6 arranges a jack under the axletree and lifts while the numbers adjust the wheel plates on their own sides.

### To Lay the Gun.

#### Section Commander.

"No ..... Gun."

"..... left (or right)."

"..... (elevation)."

#### No. 1.

"Take post to lay."

### When using Crossbar Sights.

The section commander first calls out the deflection; 4 repeats it and sets it on the sight; 1 chalks it on the gun. The section commander then calls out the elevation. 1 repeats it, and chalks it on the gun.\*

4 lays the gun, with the deflection ordered, on the auxiliary mark. As soon as the gun has been roughly laid for line, 1 takes the difference of level of wheels with the clinometer, chalks the amount either wheel is high on the felloe of the right wheel, e.g. .... R.W. 1° 30', calculates the deflection necessary to correct it,

\* Section commanders will keep a record of the elevation and deflection of each round in their note-books (Army Book 102).



and orders 4 "..... more R (or L)." 4 alters the deflection accordingly, completes the laying, and removes the sights; 2 and 3 lay down their handspikes, and 2 prepares the lanyard; 5 brings the gun to the approximate elevation; 1 then places his clinometer, set at the required elevation, on the clinometer plane, and gives "Elevate" or "Depress"; 5 turns the wheel in the required direction till the word "Halt" (the last motion should be one of depression)—a good sweep of depression should be given so as to take up backlash; 1 gives the order "Clamp"; 3 clamps the elevating arc; 1 removes the clinometer and places it in the case. Each number "takes post" after completing this work.

### When using Dial Sights.

The section commander first calls out the deflection; 1 repeats it, sets it on the deflection drum, and marks it on the gun or marking board; 4 commences to lay for line on the auxiliary mark, 5 bringing the gun to the approximate elevation.

The elevation is then called out; 1 repeats it, marks it on the gun or marking board, sets it on the elevation drum standing on the dial sight box to do so (the last motion in turning the drum should always be one tending to increase the angle) and lays for elevation. Section commanders should only repeat the deflection and elevation when an alteration is ordered by the battery commander, or when a casualty occurs.

4 and 1 lay simultaneously for line and elevation respectively, 4 keeping the bubble of the cross-level in the centre of its run—unless it is inconvenient for him to do so, in which case 1 does it.

As soon as 4 has completed laying, 1 completes his laying and gives "Clamp." 3 clamps the elevating arc, 4 removes the sights, and all numbers take post.

### To Make Ready and Fire.

Section Commander.	No. 1.
"Fire No. .... Gun."	"No. .... Ready." "Fire."

1 gives "Ready," and all the numbers step clear; 2 hooks the lanyard to the tube with his left hand, steps clear of the recoil, facing the front, and holding the lanyard in his right hand stretches it taut, keeping his hand level with the vent, forearm across the body. When he sees that all the numbers are clear, 1 gives the order "Fire," when 2 slews his body to the right and fires the gun, coils up the lanyard, passes the bight under the tube pocket strap and 4 replaces the sight or sights; 3 unclamps; 5 steps in and brings the gun to a horizontal position; 2 and 3 open the breech; 2 removes the old tube and rimes out the vent;

3 cleans the threads of the breech with a piece of waste; 2 cleans the breech screw, and applies Russian tallow to the asbestos pad when necessary.

If the order to load has been given, the numbers proceed as previously detailed. If no order to load has been given, the numbers take post.

#### Missfires.

After a pause of 10 seconds 3 raises the cam lever, 2 removes the tube and inserts a fresh one. Both numbers must keep as clear of the vent as possible. 3 lowers the cam lever; 2 hooks the lanyard and again pulls it.

If there is a further missfire—after an interval of three minutes, open the breech slowly.

None of the detachment should be directly in rear of the breech when it is opened.

After a further interval of one minute, carefully extract the cartridge.

#### To Run Up.

Section Commander.	No. 1.
	"No. .... Run up." "Halt."

2 and 3 take their handspikes at the centre with the hands next the muzzle, backs up; the other hands at the small end, backs down. They use their handspikes as levers under the rear part of the wheels, facing the rear; 4 and 5 man the wheels; 6, 7, 8, and 9 double-man, if necessary. 1 applies his handspike under the trail eye. As soon as the gun is sufficiently run up 1 gives "Halt." The numbers remove their handspikes, lay them down, and the detachment take post.

If necessary, drag ropes will be brought up and hooked by 6 and 7, and manned by the whole detachment. The command will then be "With drag ropes run up."

#### To Cease Firing.

Section Commander.	No. 1.
"Cease Firing."	"Cease Firing."

The stores are replaced by the numbers who brought them up. 5 depresses the howitzer until the cradle is on the stops. After replacing stores the numbers fall in "Detachment rear."

#### To Limber Up.

This is the reverse of unlimbering.

### To Shift the Gun from the Firing to the Travelling Position.

Limber up and depress the gun as far as it will go. Place the cover over the breech and secure it in position.

Section Commander.	No. 1.
"Shift from Firing to Travelling Position."	"No. .... Prepare to Shift the Gun."

3 threads a 2½-inch tarred rope from the rear, on the right side between the cradle and the two ribs on the gun, round the breech to 2, who passes it back to the rear on the left side between the ribs and the cradle; 2 and 3 then takes a turn round the recoil buffers in front, and lead the ends out at right angles to the gun on either side; 4, 6, and 8 man the ropes on the left side; 7, 9, and 10 on the right. 1 puts on the brake, 1 and 5 remove the nuts off the piston rods, 5 elevates; the ropes are then eased off, 2 and 3 pushing at the muzzle if necessary. 1 on the left side watches the projections on the gun and gives the necessary orders to "Ease off" and "Elevate," until the projections on the gun rest in the housing bracket.

Remove the rope or leave it in position as desired.

Care must be taken that the folding bracket between the trail is in the correct position to receive the projections on the gun—that is, folded over towards the breast of the carriage.

The stores are then replaced on the carriage ready for travelling.

### Blank Cartridges.

Cartridges of 5 lbs. L.G. will be issued for drill only. They are never to be fired at angles of elevation of less than 15°.

As no sponge is issued with this equipment, the chamber of the gun will be cleaned out with a damp water brush.

### Star Shell.

When firing star shell, 7 fuzees the shell, 1 sets the fuze and removes the safety pins.

### Duties of the No. 1.

1. He is responsible for the efficient service of his gun, and that the Section Commander's orders are carried out. The following points particularly require his attention in preparing for action:—

- (a) The filling and securing of the anchoring buffer.
- (b) The steadiness of the trail plank when used.

- (c) The clearance of  $\frac{1}{16}$ th inch of plugs, tube protecting, tail rod.
- (d) The security of the wheels.
- (e) The state of the dial sight, elevating gear, and, when firing from the ground, the brake.
- (f) That the housing bracket is folded back.

2. (Except with dial sights) when platforms are not employed, he will take the difference of levels of wheels every round as soon as the gun is fairly in its proper line, and will calculate and give to the **Layer** the necessary deflection to correct for it.

(Except with dial sights) when platforms are employed, he will take the difference of level of wheels as soon as the gun is fairly in its proper line for the first round, and will calculate the necessary deflection to correct for it. This deflection he will give to the **Layer** each round, immediately after the **Section Commander's** orders as to deflection have been given.

3. He lays for elevation, and should, from time to time, see that the tangent sight, deflection scale, and sliding leaf, are correctly set by the gun **Layer**. With dial sights, he sets all readings except the small drum, and lays for elevation. He also attends to the cross level of the sight if it is inconvenient for the **Layer** to do so.

4. He will watch the recoil of his gun, and whenever it fails to return to within 2 inches of the firing position he will order more oil to be pumped into the buffers. He will also watch all glands for leakage.

With howitzers fitted with cut-off valves to the buffer, he will try the valve with the spanner provided before firing commences to see that it is closed, and when it is necessary to pump in more oil he will see that the valves are opened before and closed after doing so.

5. He gives the orders to load and to fire his gun, and his gun is never to be fired without his order.

6. In the absence of the **Section Commander** the senior No. 1 of the section takes his place. If it is inconvenient for the **Section Commander**, owing to other duties, to pass down the orders received from the **Battery Commander**, he should do so for him; and he should always be on the look out for this occurring.

### Duties of the Gun Layer.

1. He is responsible for laying the gun for line, and, with dial sights, for cross-levelling the sight unless it is inconvenient for him to do so.

2. Before laying each round he will (except with dial sights) check the readings of the sliding leaves, to see that they have not shifted.

He will then (except with dial sights) set on the deflection scale the deflection ordered by the **Section Commander**, and afterwards add to it the deflection ordered by the No. 1 for difference of levels of wheels.

### Points Requiring Attention in Action.

The shell should be rammed sufficiently hard home to ensure its not slipping back when the gun is elevated.

The jamming screws of the radial arm should be so adjusted as to admit of the gun being easily traversed, without allowing too much play.

A careful watch should be kept on the glands to ascertain if there is leakage. If any leakage occurs, the glands must be screwed up, but not too much, as pressure will cause undue friction.

Any alteration in the position of the carriage, or of the gun in the cradle, should be noted. If at any time the gun has slipped back in the cradle more than 2 inches, it should be pumped up.

The clamping hand wheel of the quick-motion elevating gear, where such is fitted, should be clamped tight before action.

The clamp of the elevating arc should be kept free from oil, and should be clamped tightly after laying for elevation. The handle should be adjusted so as to facilitate this.

## SHIFTS.

### 6-inch B.L. HOWITZER.

#### To Shift from Travelling to Top Carriage by Gyn.

Strength of the detachment 13 numbers.

#### *Stores Required.*

Gyn, 18 feet, light, complete	...	...	1
Drag ropes, heavy, pairs	...	...	4
Hammers, claw	...	...	1
Skids, 3' x 4" x 5"	...	...	1
Lever, lengthening, No. 4	...	...	1
Spanners,	McMahon	...	1
	No. 180 (for tension bolt and pivot plug)	...	1
	No. 181, socket	...	1
	" 83, nut and gland	...	1
	anchoring	...	1
	No. 84, nut tube anchoring	...	1

NOTE.—Where the slot on the sheath of the axle is not sufficiently cut away to allow of the carriage being lowered on to the pivot plate without resting on the anchoring buffer, the anchoring buffer will have to be removed as follows :—Disconnect the

cross head from the radial arm, first withdrawing piston rod as far as possible, unscrew and remove the cross head from front end of piston rod, unscrew and remove the nut on rear end of piston, the volute springs can then be removed. Unscrew the large nut in front of stay, the buffer can then be taken out from the rear.

Officer.  
"Shift the Gun."

No. 1.  
"Prepare to shift the Gun."  
"Prepare to shift the Gyn."  
"Shift the Gun."

"Prepare to shift the Gun."—Remove the sights, breech fittings, and brake gear, cast loose and lay down handspikes, &c.

*Radial Arm.*—The radial arm is removed by disconnecting the anchoring buffer and unscrewing the clamping and jamming screws.

*Pivot Plug.*—Screw in the pivot plug and see that all the nuts of the pivot plate are down flush.

The gyn\* is brought up, put together, and raised as near the emplacement as possible, the howitzer traversed extreme right.

"Prepare to place the Gyn."—The gyn is placed over the C.G. of the howitzer, the prypole resting on the right front corner of the platform, the left cheek close against the left side of emplacement.†

"Shift the Gun."—The carriage is slung with two drag ropes, passed twice round the axletree inside the wheels, drag ropes on the double. Steadying ropes are applied in the usual manner‡ and the gyn worked until the wheels are clear of the ground, when they are removed. Lower the howitzer and carriage until the latter rests on the pivot plate; the drag ropes are then removed. The gyn should now be placed so that the head is about 6 inches in rear of the C.G. (otherwise some difficulty will be experienced in getting the howitzer into the trunnion holes of the top carriage).

The howitzer is slung by means of a drag rope on the double, passed under the muzzle, in front of the guides, and round a 4 x 5 placed in the breech, steadying ropes applied as before, remove capsquare, and work the gyn until the howitzer is sufficiently high to admit of the top carriage being fixed. The side pieces of the top carriage are placed in position, the transom placed in front, and the whole keyed up.

The howitzer is lowered into the trunnion holes, the capsquares, elevating gear, breech fittings, nut and springs of pivot plug adjusted.

\* When this shift is carried out in a regular constructed siege battery, Mark III gyn is the most suitable.

† The gyn may be placed in any position when the howitzer is in the open.

‡ The buffers should be full and a piece of wood placed between the front of cradle and the sight bracket, to prevent the howitzer sliding through the cradle.

### To Shift from Top to Travelling Carriage.

This operation is the reverse of the above. The howitzer should be slightly muzzle heavy when lowering to travelling carriage.

### To Shift from Travelling to Top Carriage without the Aid of a Gyn.

This operation may be carried out as follows :—

Strength of detachment, 19 numbers.

#### *Stores Required.*

Drag ropes ...	...	...	...	...	...	2
Handspikes, 6-feet...	...	...	...	...	...	5
Lashings, 1½ inch, 3 fathoms	...	...	...	...	...	2
Lever, 12-feet	...	...	...	...	...	1
Roller, elm, ground, 3' × 6"	...	...	...	...	...	1
Scotches, of sorts	...	...	...	...	...	12
Skids, oak, 14' × 5½" × 5½"	...	...	...	...	...	1
" " 3' × 6" × 9"	...	...	...	...	...	6
" " 3' × 4" × 5"	...	...	...	...	...	3
" " 3' × 6" × 3"	...	...	...	...	...	2
Spanner, McMahon	...	...	...	...	...	1
Hammer and punch	...	...	...	...	...	1

Elevate the howitzer about 60°, and run it up till the wheels touch the parapet. Place two 3 × 6 × 9's, close to the pivot plate, and by means of wheel purchases and two medium scotches, run the howitzer back till the wheels rest on the 6 × 9's and the carriage is in a proper position for lowering on to the pivot plate; scotch the wheels.

Remove the sights, breech fittings, capsquares, and cast loose and lay down handspikes, &c.

A 4 × 5 is placed in the muzzle, and supported so that the muzzle will be 5 feet above the platform, or the piece elevated about 6°. A limber is now run into the emplacement and over the trail, with one wheel touching the right of the carriage, and the other outside the left wheel of the carriage. Lash a 14 × 5½ × 5½ on top of the wheels, having a spoke vertical, so that the returns will pass half in front and half in rear of the vertical spoke. The limber box is removed, a 6 × 9 on its flat is placed on the limber bed, with its edge bearing against that portion of the limber bed where the front of the box bears. Another 6 × 9 on its edge, between that and the rear of the limber. Apply a lever over that and under the breech, with a 3 × 6 between the point and the piston rods. Bear down till a 6-inch roller can be placed in the breech over the 14 × 5½ × 5½, following up with

points of handspikes in the trunnion holes. As soon as the roller is placed in the breech, come up on the lever, withdraw the handspikes, and leave the howitzer suspended. Scotch up the roller with two small scotches. The height of the bottom of the trunnions is then about 4 feet 9 inches above the pivot plate.

#### To Lower the Carriage.

Two  $6 \times 9$ 's, one on top of the other, resting on the pivot plate, are placed underneath the bracket on each side, with two  $4 \times 5$ 's on top; across these a  $6 \times 5$  as a fulcrum. Apply two handspikes in front under the axletree, take the weight on scotches on top of the skidding, and remove the wheels; replace the linch pins, place the middle of a handspike underneath each axletree arm, manned by four numbers. Take the weight of the carriage, remove the skidding, allow the carriage to rest on the pivot plate, and connect up. The top carriage is then put on and secured, the lever applied under the breech again; take the weight of the howitzer, withdraw the roller from the breech, come up on the lever, and allow the trunnions to rest in the trunnion holes. The capsquares, elevating gear, breech fittings, &c., are adjusted and all stores arranged.

#### To Shift the Travelling Carriage.

This operation is the reverse of the above.

NOTE.—This method of shifting should always be adopted in open batteries when the employment of gyns would serve to expose the position of the battery. But in well concealed positions the method of shifting by gyn is quicker and easier, requires less stores, and a smaller detachment.

#### To Mount or Dismount the Howitzer on to or from its Travelling Carriage.

This operation would always be done with the aid of a gyn.

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